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511 Traffic Program
Enhanced Data Fusion System (EDFS)
Requirements Specification

Task Order 6.23

Version 1.9

Prepared by:
Leidos

1000 Broadway, Suite 675, Oakland, CA 94607

Prepared for:
Metropolitan Transportation Commission

101 8th Street, Oakland, CA94607

Revision Chart

Document Description	Date	Version Number
First Internal Draft	05/02/2011	0.1
Incorporated comments from MTC and TIC	07/07/2011	0.2
Incorporated 2nd round of comments from MTC, updated glossary	08/05/2011	0.3
Updated 1.1.9, 2.3.16, added 1.1.10	08/25/2011	0.4
Version 1.0 finalized	08/26/2011	1.0
Priorities updated	02/06/2012	1.1
Slight priority changes, accepted all track changes	11/7/2012	1.2
Map requirement changes, added requirement for change request submittal on events that require approval before republishing.	04/2/2013	1.3
Requirements updated based on discussion with Roger. Add e.g. for alarms. Modified floodgate, publishing, dissemination channels requirements. Modified system requirements.	04/19/2013	1.4
Changes confirmed and approved by MTC. Requirements related to change request were dropped based on the understanding that updates from a source that has been confirmed by operator can be automatically publish. System scalability requirement altered. System configuration change and restart requirement altered. Option to create floodgates using text (TTS) along with wav file will be provided on user interface. However this feature won't be activated until IVR starts supporting TTS. Floodgates requirements were clarified. No recording capability will be provided within EDFS, operators will use exiting tool to record floodgate messages.	04/26/2013	1.5
Added provision to create multiple schedules per event. Moved Lane Impact at schedule level. Update category and	08/12/2013	

subcategory list of event types and subtypes. Removed items deleted per TIC's request (Impact, Peak hour delay, Alternate Route, Peak alternate delay, # of lanes, lanes, total, Time of day) Deleted many lists since they were not accurate and we'll be loading them from current EDFS. Added fields that weren't captured.		
Based on discussions with Derrick Fesler Update requirements (1.2.18,1.3.1,1.3.2,1.4.24,1.4.25,1.4.33)	03/06/2014	1.7
Updated requirements to include change requests from UAT testing. Direction field was added back as there are roadways in MLDB that don't have direction text in the name. Ability to create events that spans multiple counties. Updated required and mandatory fields and default values.	03/26/2014	1.8
Updated requirements for external systems' integration	08/25/2014	1.9

Contents

Purpose and Scope of Requirements

The purpose of this document is to communicate the understanding of requirements associated with the Enhanced Data Fusion System (EDFS) replacement. The descriptions contained within this document are specifically divided into its functional, system, implementation, and publishing requirements. This document lists the current features supported by EDFS replacement that are planned to be retained and also any new enhancements proposed by key stakeholders. For the purposes of this document, the replacement for the current "Enhanced Data Fusion System (EDFS)" system will be generally referred to as EDFS for ease of use.

1. User Interface Requirements

1.1. General

1.1.1. The EDFS shall provide the following user interfaces at the minimum:

1.1.1.1. Events List - a list of the events in the system that can be filtered or sorted by the users

1.1.1.2. Events Details - page that displays details about a specific event record

1.1.1.3. Alarms - a form of notification that some action is required for an event that exist in the EDFS

1.1.1.4. Reporting - allows users to generate reports for data entries up to a configurable number of days in the past

1.1.1.5. System Management – interface that allows authorized users to change EDFS configuration, settings, manage users, data sources, etc.

1.1.2. The EDFS should use a web based user interface for all data maintenance and system management needs.

1.1.3. The EDFS user interface shall not require a specific user screen resolution to be used.

1.1.4. The web site should not employ software that requires additional client site installation besides a web browser.

1.1.5. The EDFS Web site shall employ the Secure Sockets Layer cryptographic protocol.

1.1.6. From the Home Page, the user shall be able to access information for a requested event with no more than two "clicks" of the mouse.

1.1.7. The Web site home page shall be completely displayed within 15 seconds of opening the program when using an ADSL connection and when no other processes using that connection are running.

1.1.8. The EDFS Web Site shall update (refresh) the events list automatically at predefined frequency (configurable in the system parameters). Data refresh shall not affect user interaction with the system.

1.1.9. The EDFS Web site shall take no more than 15 seconds to load or refresh the "event list" or "event details" pages.

1.1.10. The EDFS Web site shall fulfill performance requirements (load and refresh time of less than 15 seconds) when user computer is connected to the internet via 512Kbps downstream and 64Kbps upstream DSL line.

1.1.11. Hyperlinks on the EDFS which direct users to other locations within the website shall use relative paths.

1.1.12. The EDFS shall have help functionality that includes but is not limited to system operation instructions for all types of EDFS users, SOPs, EOPs, and an initial operator training course.

1.1.13. The EDFS shall update the Event Details user interface (if open/visible) when selection of event record in Events List changes.

1.1.14. The EDFS shall allow users to open multiple interfaces (e.g. list and details, alerts, etc.) in parallel to be able to use workstations with multiple monitors.

1.1.15. Changes made to events shall automatically update all relevant EDFS interfaces in parallel.

User Access Control

1.1.16. The EDFS shall prompt the user for a username and password to gain access to the application.

1.1.17. The EDFS shall allow a user to log in using a previously issued username and password.

1.1.18. The EDFS shall restrict logged-in users from logging into the EDFS via more than one workstation or browser window. A user who is already logged in on another workstation and tries to log in on another workstation or browser window shall be automatically logged off the first machine or browser window and a message shall be displayed explaining what happened.

1.1.19. The EDFS shall allow a user to request to be 'remembered' on the computer they are currently using to access EDFS features.

1.1.20. The EDFS shall remember only the username and not the password.

1.1.21. The EDFS shall allow a user to log off from the EDFS service.

1.1.22. Passwords associated with the operator accounts shall be stored in an encrypted format.

1.1.23. The EDFS shall lock the user account for a configurable amount of time after three consecutive password attempts are made.

1.1.24. The EDFS shall provide users the ability to reset forgotten password regardless of whether the account has been locked or not.

1.1.25. The EDFS shall allow users to reset forgotten password by answering security questions with pre-configured answers and receiving an email message with a new password to the email address specified in the user profile.

Navigation

1.1.26. The EDFS shall open automatically to show the Events List page whenever the operator completes a log in to EDFS.

1.1.27. The EDFS shall allow the user to navigate between the EDFS function pages using menus or similar controls.

1.1.28. The EDFS shall display the currently logged on username somewhere in the browser window or in the title bar of the window.

1.1.29. The EDFS shall display the refresh date and time somewhere in the browser window or in the title bar of the window.

1.1.30. The EDFS shall allow users to navigate between various sections using keyboard tab.

Error Messages

1.1.31. The EDFS shall alert the operator with a pop up or similar mechanism whenever an error occurs during operators' interaction with the system.

1.1.32. The EDFS shall alert the operator with a pop up or similar mechanism whenever conflicting data (duplicates, dates in the past, specifying a direction that does not exist on a freeway) is entered into the system.

1.1.33. The pop up box or similar mechanism shall contain sufficient information about the error to allow an operator to identify and/or resolve the issue.

1.2. Events List

1.2.1. The EDFS shall be able to show the events list page with a list of the events in the system that can be filtered or sorted by the users.

1.2.2. The EDFS shall be able to display a legend indicating the colors or icons used.

1.2.3. The EDFS Events List shall provide, at the minimum, the following columns:

1.2.3.1. EDFS Event ID number

1.2.3.2. Event Type

1.2.3.3. Data Source

1.2.3.4. Data Source ID /Log Number

1.2.3.5. Event Description

1.2.3.6. County

1.2.3.7. City

1.2.3.8. Road and Direction

1.2.3.9. Priority (Certain type of incidents such as sigalerts will be of higher priority than others. This will be a non-editable field that will be based on type of incident and automatically determined by system. This can be used to trigger alarms. This is for future use and shall be implemented when data becomes available.)

1.2.3.10. Date and Time Received

1.2.3.11. Date and Time Last Modified

1.2.3.12. Workflow Status (New, Discarded, Published, or Closed)

1.2.3.13. Publishing Option (Automatic or Manual)

1.2.3.14. Owner of the event

1.2.4. The EDFS Events List should provide, the following columns:

1.2.4.1. Road and Direction

1.2.4.1.1. Cross Street if applicable

1.2.4.2. Alarm Status

1.2.5. The EDFS shall be able to show the Events List page with list of the events in the system according to user-specified filters and sort order of columns. All events shall have the same columns.

1.2.6. For each event list record, the user shall have the ability to select the record and view the "Event Details" page showing data of the selected record.

1.2.7. Related events should be indicated on the list as associated with each other.

1.2.8. The EDFS shall display different types of events or events in different workflow states using visual clues such as colors, icons, highlights, and font style.

1.2.9. The EDFS should display the current Floodgate status for each event, allowing the users to see which events have floodgates playing.

1.2.10. The EDFS should display the current Ticker status for each event, allowing the users to see which events have tickers running.

1.2.11. The EDFS should display the current Congestion OI/Break-a-Link status for each event, allowing the users to see which events have Congestion OI/Break-a-Link activated.

1.2.12. Users shall be able to filter the EDFS Events List by:

1.2.12.1. County

1.2.12.2. City

1.2.12.3. Road Name and Direction

1.2.12.4. Data Source Type (Source of data)

1.2.12.5. Event Type (Transit or Traffic)

1.2.12.6. Event Category Type (Incident, Construction, events)

1.2.12.7. Event Subcategory Type (Long-term construction, short-term construction, accident with severe injury)

1.2.12.8. Date and Time Received/Created

1.2.12.9. Date and Time Modified

1.2.12.10. Priority

1.2.12.11. EDFS Event ID

1.2.12.12. Event Source ID (E.g. CHP CAD ID)

1.2.12.13. Workflow Status

1.2.13. The EDFS Events List shall provide configurable (system wide) number of data entries in a single page view.

1.2.14. Multiple pages with event lists shall be available if the number of data entries in the system is greater than number of entries to be shown on a single page (pagination).

1.2.15. The EDFS Events List should allow the user to perform actions to multiple data entries simultaneously. The actions include:

1.2.15.1. Changing the Workflow Status

1.2.15.2. Changing the Alarm Date/Time

1.2.15.3. Changing the Ownership of the Event.

1.2.16. The EDFS Events List shall allow the user to print the page view.

1.2.17. The EDFS Events List should provide the user with the ability to export the list of events in CSV format.

1.2.18. The EDFS Events List should display newly created data entries on the top of the list if no other sorting options have been selected and applied (default setting).

1.2.19. The EDFS Events List shall allow the user to sort data entries by the columns of information.

1.2.20. The EDFS Events List shall allow a user to filter data entries by the values allowed in the columns of information.

1.2.21. The EDFS Event List should allow a user to search data entries by ID, date, location (city/county/roadway) and data type (traffic/transit).

1.2.22. The EDFS Events List shall indicate events opened (visible in Event Details) by other operators (including their user names).

1.3. Events Map

1.3.1. When latitude and longitude information is available for an event, the EDFS shall provide an ability to view that event on Google map in default view. The map shall zoom and center to the event location.

1.3.2. When latitude and longitude information isn't available for an event, the EDFS shall just provide an ability to open Google map in default view centered on Bay Area. Users shall then be able to pan and zoom the map and be able to capture latitude and longitude information by clicking on the map and assign those to an event.

1.4. Event Details

General Requirements

1.4.1. The EDFS shall provide an Event Details page that will display details about a specific event record.

1.4.2. The user shall be able to leave any of the non-required fields blank in case that information is not available. The EDFS shall not publish events without required fields populated. The EDFS shall warn users if any of the required fields is/are missing when the data is being saved.

1.4.3. The EDFS Events Details Page should display the selections under the drop down menus in the order of popularity of use, with the most popularly used selections on the top of the list.

1.4.4. The EDFS Events Details Page should provide suggestions of selections when users type in the starting letters of the desired selection in the drop down menus.

1.4.5. The EDFS Events Details Page shall allow a user to save any modifications made to the each event.

1.4.6. When a data field in an EDFS Event Details requires entry of a time and/or date, the current time and/or date shall appear as the default entry, if appropriate for the field.

Event Information

1.4.7. The EDFS shall provide predefined list or similar controls for users to specify event information that would be used to develop system-generated text or scripts for publishing.

1.4.8. The EDFS shall provide users with the ability to perform the following actions:

1.4.8.1. View an event

1.4.8.2. Create an event

1.4.8.3. Modify an event

1.4.8.4. Confirm modifications to an event and publish

1.4.8.5. Discard an event

1.4.8.6. Close an event

1.4.9. The EDFS shall use same event details user interface for all types of events. Some data entry fields and/or controls may be enabled or disabled or hidden depending on the event type.

1.4.10. The EDFS Events Details Page shall display and allow users to modify as necessary the following data field values (* identifies required data for events to be published):

1.4.10.1. Event Type*

1.4.10.1.1. Traffic

1.4.10.1.2. Transit

1.4.10.1.3. Emergency

1.4.10.1.4. General

1.4.10.2. Event Sub Type*

1.4.10.2.1. Traffic Sub Types

1.4.10.2.1.1. Incident (Accidents, Fire, Weather, Short-term construction, Roadwork etc.). The list of entries will be provided from existing EDFS.

1.4.10.2.1.2. Construction. The list of entries will be provided from existing EDFS.

1.4.10.2.1.3. Special-Event. The list of entries will be provided from existing EDFS

1.4.10.2.2. Transit Sub Types

1.4.10.2.2.1. TBD

1.4.10.2.3. Emergency type events will not have any subtype.

1.4.10.2.4. General type events will not have any subtype.

1.4.10.3. For special events, EDFS shall provide ability to define additional detail on an event. For e.g. a sporting event can further have Nation

League Playoffs under detail information. The data for this lookup shall come from current EDFS.

1.4.10.4. Event Location*

1.4.10.4.1. Start County

1.4.10.4.2. End County

1.4.10.4.3. Lat/Long

1.4.10.4.4. Postmiles

1.4.10.4.5. Source Location Description (e.g. JWO)

1.4.10.4.6. Route/Facility, Bridge and Venues

1.4.10.4.7. Direction

1.4.10.4.8. Article (e.g. before, after, at, between)

1.4.10.4.9. Cross Street/Exit Name (Start)

1.4.10.4.10. Cross Street/Exit Name (End)

1.4.10.4.11. Start County, End County, Route, Article and Start Cross Street are required fields for creating Incidents and Constructions.

1.4.10.4.12. Start County, End County, Route and Article are required fields for creating special events.

1.4.10.5. Impact*

1.4.10.5.1. Play Type (The list of entries will be provided from existing EDFS)

1.4.10.5.2. Advice (The list of entries will be provided from existing EDFS)

1.4.10.5.3. Pavement conditions, will only apply to incident type events. (The list of entries will be provided from existing EDFS)

1.4.10.5.4. Weather conditions, will only apply to incident type events.(The list of entries will be provided from existing EDFS)

1.4.10.5.5. Lane Impact (The list of entries will be provided from existing EDFS)*. Default should be expected delays.

1.4.10.5.6. Computed Score

1.4.10.6. Expected delay time

1.4.10.7. Expected miles of back up

1.4.10.8. Event Background Information

1.4.10.8.1. EDFS Event ID*

1.4.10.8.2. Source of Event *

1.4.10.8.2.1. Caltrans LCS

1.4.10.8.2.2. CWWP

1.4.10.8.2.3. CHP CAD

1.4.10.8.2.4. ATMS

1.4.10.8.2.5. Events Venue Provider

1.4.10.8.2.6. Transit CMS

1.4.10.8.2.7. Transit Agencies

1.4.10.8.2.8. Caltrans TMC

1.4.10.8.2.9. MTC

1.4.10.8.2.10. Twitter

1.4.10.8.2.11. Media (E.g. Radio, TV, News feed)

1.4.10.8.2.12. EDFS User

1.4.10.8.2.13. Others

1.4.10.8.3. Source should default to CHP for incidents, Caltrans for Construction and TIC for special events.

1.4.10.8.4. Event ID in Source's System

1.4.10.8.5. Event Owner

1.4.10.8.6. Additional Event identifier information. I.E. CHP Log Number and CHP Dispatch Center, or Caltrans Closure Number and Caltrans District Number.

1.4.10.8.7. Original Event Description from Source

1.4.10.9. Event Schedule

1.4.10.9.1. Event Start Date * (Shall be a required only for special events and Construction)

1.4.10.9.2. Event Start Time *(Shall be a required only for special events and Construction)

1.4.10.9.3. Event End Date

1.4.10.9.4. Event End Time

1.4.10.9.5. Estimated Event Duration

1.4.10.9.6. Lead Time – Default should be 15 minutes

1.4.10.9.7. Lag Time- Default should be 15 minutes.

1.4.10.9.8. Continuous

1.4.10.9.9. Active Days (All, Mon, Tue, Wed, Thru, Fir, Sat, Sun, Weekday, Weekend)

1.4.10.9.10. Active days should be automatically determined by dates selections made by the used. If the schedule spans multiple days then Continuous should be automatically set to true. Both Active Days and Continuous shall not be visible to the user on the interface but should be part of event description.

1.4.10.9.11. For Long-Term construction and events that span over multiple days EDFS shall allow creating multiple schedules per event.

1.4.10.9.12. Active Days, Alternate Route and Peak hour delay should be optional for Construction and Special Events. Incidents creation should not display any of these fields.

1.4.10.9.13. Operators shall be able to define Lane Impacts for an incident type event.

1.4.10.9.14. In case of special event and constructions Operators shall be able to define Lane Impacts for each individual schedule.

1.4.10.9.15. Lane Impacs is a composite field which will be defined using various other fields listed below.

1.4.10.9.15.1. Impact Level, Lane Type, Lane status and Lane details (The list of entries will be provided from existing EDFS). Lane Type and Lane Status are required for entering an incident and construction type events. Creating a special event shouldn't require Lane Impacts.

1.4.10.9.15.2. Operators shall also be able to graphically define lane impacts. The underlying link definition should be used to construct lane diagram. In case where an incident impacts expands multiple exists and multiple links, the lane configuration for first link should be used. The operators can choose to define impact using list as well as graphical lane representation.

1.4.10.9.16. Related EDFS Event IDs and types of the relationships

1.4.10.9.16.1. Parent

1.4.10.9.16.2. Child

1.4.10.9.16.3. Duplicate

1.4.10.9.16.4. Other

1.4.10.9.17. Point of Contact

1.4.10.9.18. POC Phone

1.4.10.9.19. POC Email (optional)

1.4.10.9.20. Notes

1.4.10.9.21. Only supervisors should be allowed to create special events and Construction but once created anyone can view/edit them.

Event Data Entry

1.4.11. The EDFS shall provide a list of valid values to be selected from which the event data can be defined as lookup value list (event category, event type, etc.).

1.4.12. The EDFS shall not automatically change a user-defined start date/time, end date/time and duration for published events.

1.4.13. The EDFS shall populate the start and end dates/times based on user-specified information that shall be provided in the following ways:

1.4.13.1. User directly specifies both dates/times using a date/time entry control (for example a date/time picker control in web user interface)

1.4.13.2. User specifies one of the dates/times and the event duration (for example using a combination of date/time entry control and drop down list)

1.4.14. The EDFS shall calculate and update duration automatically when event start and end date/time are specified using date/time entry controls.

1.4.15. The EDFS may provide users with the ability to view list of the events that were marked as “related” by EDFS users or determined automatically by the system as “related” and their type of relationship.

1.4.16. The EDFS may allow users to click on a link or a similar user control to open the EDFS Details Page of each related EDFS Event(s).

1.4.17. The EDFS may allow users to add relationship between the displayed Event Data Entry and another Event Data Entry by one of the following methods:

1.4.17.1. Entering the EDFS ID Number of the related Event Data Entry(ies)

1.4.17.2. Selecting one or more event(s) from the list of published active events

1.4.17.3. Selecting one or more event(s) from the list of nearby, actively-published events

1.4.18. The EDFS should allow the user to specify the location of an event, using an interactive map interface.

1.4.19. Event locations shall be defined using latitude/longitude coordinates that are derived from cross street associated with the event.

1.4.20. The start and end location should be geographically sorted when displayed to users.

1.4.21. EDFS shall allow users to create an event that spans multiple counties. For example, the Bay Bridge runs between Alameda and San Francisco Counties. Operators shall be able to add locations "between" or "from/to" that start in one county and end in another. For example, WB I-80 between the Bay Bridge Toll Plaza in Alameda County and the Fremont St off-ramp in San Francisco County.

1.4.22. Event latitude/longitude shall be determined and set automatically if other means of location description were used (milepost, grids, etc.)

1.4.23. The EDFS shall allow the user to define a point location along a roadway (milepost),meaning allow operators to assign a location to an event received by selecting roads and intersections from drop down based on lat/long or post miles.

1.4.24. When location information for a new event is available and sufficient, the EDFS may display a list of nearby, actively-published events within the proximity of the new event.

1.4.25. The EDFS may provide a graphical lane configuration depiction to the operator, allowing lane blockage information to be entered using point-and-click methods.

1.4.26. The EDFS shall use predefined lane configurations to determine the number of lanes, shoulders, and exit ramp lanes to display to the operator whenever possible. Operators will have to use generic lane definitions when lane configuration is inadequate.

1.4.27. The EDFS shall allow the operator to report misconfiguration with the automatically generated lane configuration (i.e. number of lanes, shoulders, and exit ramp lanes) at the event location. These reports shall be recorded into a database which can be reviewed later to perform necessary updates to MLDB..

1.4.28. EDFS should be able to calculate numeric score of impact using algorithm provided during design time and based on incident type, estimated duration, number of lanes affected, total number of lanes, road type.

1.4.29. EDFS should allow users to override calculated value and manually enter numeric score of impact.

1.4.30. Event Owner in the EDFS Background Details Information shall be set automatically to the user currently modifying an event data.

1.4.31. Events coming from automated or semi-automated event sources shall have Event Source and Event ID in Source System set automatically.

1.4.32. The EDFS shall provide users with the ability to change the source of the event field value.

1.4.33. The EDFS shall be designed such that an operator can create an event, enter required basic information and select appropriate dissemination channels within 60 seconds except for cases when the user must verify information for a non-trusted event.

1.4.34. The EDFS shall formulate the final event description text for publishing as the data fields are being populated.

1.4.35. The EDFS should display the final event description text for publishing in a textbox or similar control that allows manual editing. Note, the editing feature will not be available until IVR can process text to speech.

1.4.36. EDFS shall allow users to associate transit announcement type events to transit agency, route, direction and stop.

1.4.37. The EDFS shall allow users to enter their notes in dedicated field. Notes content shall be saved in event audit information. Last note shall be kept as part of event background details information (all previous comments shall be present as changed field values in the audit track).

1.4.38. The EDFS shall allow an operator to change the workflow status of the event by explicitly selecting new state or by selecting action to be performed (for example clicking “Discard Event” button).

1.4.39. The EDFS shall alert operator when event information is coming from semi-automated non-trusted data source (e.g. Twitter) and needs to be verified before publishing.

1.4.40. The EDFS shall allow the user to specify weather conditions for the event.

1.4.41. The EDFS shall minimize the number of key strokes for the event entries while providing drop-down menus and check boxes.

1.4.42. The EDFS may be able to show proposed additional list of actions (according to SOP and EOP) to be taken based on event type and impact. This list should be configurable using system management interface. Operators shall be able to switch this list/reminder functionality off.

1.4.43. EDFS shall display message while editing an event which confirms that the user "wishes to leave this page?" if the event is not published or changes made.

1.4.44. EDFS shall not allow operators to change the event type (incident, construction or special events) once an event has been created and published. Operators will have to close out the event and create a new event if they want to change the event type.

1.4.45.

Event Audit Details

1.4.46. The EDFS Audit Details Section shall allow users with the ability to view the following Audit Details information:

1.4.46.1. Username (e.g. User who changed them)

1.4.46.2. Date of Change

1.4.46.3. Time of Change

1.4.46.4. Field(s) Changed (for example, any changes made to the Notes will have "Notes" as the value for the Field(s) Changed information)

1.4.46.5. Changed from (i.e. previous values)

1.4.46.6. Changed to (i.e. end values)

1.4.46.7. Information from external system

1.4.46.8. Alarms sent

1.4.47. The EDFS shall display the audit track of the changes of individual field values by grouping them into single change record in chronological order (each field value change shall be kept as a separate audit record regardless of how it is shown to the user).

1.4.48. When the system makes changes to data field(s) based on the data received from external sources, the EDFS shall preserve the corresponding original information.

1.4.49. The EDFS may allow users to print the Audit Details for each event data entry.

Publishing Details

1.4.50. The EDFS shall provide users with the ability to view and update the following Publishing Details information:

1.4.50.1. Activation Date

1.4.50.2. Deactivation Date

1.4.50.3. Activation Time

1.4.50.4. Deactivation Time

1.4.50.5. Lead Time Period (e.g. period of time before event start time)

1.4.50.6. Lag Time Period (e.g. period of time after event end time)

1.4.50.7. Dissemination channels (channels marked by * shall require supervisor privileges)

1.4.50.7.1. 511 Traffic Website

1.4.50.7.1.1. Breaking News using Traffic Admin

1.4.50.7.1.2. Construction News using Traffic Admin

1.4.50.7.1.3. Traffic Map (Congestion and B-A-L)* using Congestion OI

1.4.50.7.2. Floodgates on 511 Phone * using Floodgate manager

1.4.50.7.3. Floodgate on MY 511 Phone * using Floodgate manager

1.4.50.7.4. 511 Traffic Data Feed (e.g. TOMS) *

1.4.50.7.5. Twitter (multiple accounts to be used in parallel requiring each of them treated as individual dissemination channel that is selected for publishing individually)

1.4.50.7.6. Ticker

1.4.50.7.7. 511 Transit Website using Transit CMS

1.4.50.7.8. 511 Mobile Website * (Unknown)

1.4.51. The default activation date and time shall be set to event scheduled start date and time minus lead time.

1.4.52. The default deactivation date and time shall be set to event scheduled end date and time plus lag time.

1.4.53. The EDFS shall not automatically change user-defined activation date/time, deactivation date/time and duration for published events.

1.4.54. The EDFS shall populate the activation and deactivation dates/times based on user-specified information that shall be provided in the following ways:

1.4.54.1.1. User directly specifies both dates/times using a date/time entry control (for example a date/time picker control in web user interface)

1.4.54.1.2. User specifies one of the dates/times and the event duration (for example using a combination of date/time entry control and drop down list)

1.4.55. The EDFS shall calculate and update lead and/or lag times automatically when event start and end dates/times and event activation and deactivation dates/times are specified using date/time entry controls.

1.4.56. The EDFS shall select all available dissemination channels that are marked as default for dissemination channels configuration.

1.4.57. The EDFS shall allow users to manually select optional dissemination channels to publish the event.

1.4.58. The EDFS shall provide checkboxes or similar tools for users to select dissemination channels.

1.4.59. The final messages to be published onto the selected dissemination channels shall be the same.

1.4.60. The EDFS shall allow a user to confirm the final description is accurate.

1.4.61. The EDFS shall allow a user to confirm the event data entry is ready to be distributed out of the EDFS.

1.4.62. The EDFS should have a permission field (per user) for creating a manual message for publishing to the authorized channels of dissemination.

Integrated External Systems

1.4.63. The EDFS shall allow users to select each of the integrated tools/systems for activation:

1.4.63.1. Twitter integration

1.4.63.1.1. EDFS shall allow user to select Twitter as dissemination channel

1.4.63.1.2. User shall be able to edit message to be published on Twitter

1.4.63.1.3. Message should include pre-generated URL (editable by the user) to Traffic.511 Breaking News or Transit.511 announcement page

1.4.63.2. Congestion OI

1.4.63.2.1. When the user activates the Congestion OI, the EDFS shall provide users with the ability to perform the following actions:

1.4.63.2.1.1. Select a Roadway

1.4.63.2.1.2. Select a Direction

1.4.63.2.1.3. Select a Link

1.4.63.2.1.4. Select a Congestion Level (green, yellow, red, black or closed)

1.4.63.2.1.5. Critical links shall be depicted differently from regular links.

1.4.63.2.2. Specify the duration in minutes; the default shall be set to 30 minutes.

1.4.63.2.3. EDFS shall provide list of active congestions and B-A-Ls (break a link) and operators shall be able to edit and clear them.

1.4.63.2.4. EDFS shall allow user to deactivate congestion record without closing parent event in EDFS

1.4.64. The EDFS should allow users to select each of the integrated tools/systems for activation:

1.4.64.1. Ticker Administration Tool

1.4.64.1.1. When the user activates Ticker Administration, the EDFS shall provide users with the ability to change following information:

1.4.64.1.1.1. Message Text

1.4.64.1.1.2. Start Date

1.4.64.1.1.3. Start Time

1.4.64.1.1.4. End Date

1.4.64.1.1.5. End Time

1.4.64.1.1.6. Target URL

1.4.64.1.1.7. Link Color

1.4.64.1.1.8. Sites

1.4.64.1.1.8.1. Main (http://www.511.org)

1.4.64.1.1.8.2. Traffic (http://traffic.511.org)

1.4.64.1.1.8.3. Transit (http://transit.511.org)

1.4.64.1.1.8.4. MY 511 (http://www.my511.org)

1.4.64.1.1.9. Details

1.4.64.1.2. EDFS shall provide a list of active tickers in the system and operators shall be able to edit and clear them.

1.4.64.1.3. EDFS shall allow user to deactivate Ticker message without closing parent event in EDFS.

1.4.64.2. 511 Transit CMS

1.4.64.2.1. When the user activates the Transit CMS, the EDFS shall provide users with the ability to change following information:

1.4.64.2.1.1. Provider (agency)

1.4.64.2.1.2. Title

1.4.64.2.1.3. Content

1.4.64.2.1.4. Effective (published) from

1.4.64.2.1.5. Effective (published) to

1.4.64.2.1.6. URL for additional event information

1.4.64.2.1.7. Route

1.4.64.2.1.8. Stop/station

1.4.64.2.2. EDFS shall provide a list of active announcements in the system and operators shall be able to edit and clear them.

1.4.64.2.3. Users shall be able to able to search announcements by title text.

1.4.64.2.4. EDFS shall allow user to deactivate transit announcement without closing parent event in EDFS.

1.4.64.3. 511 Traffic Admin

1.4.64.3.1. When the user activates the Traffic Admin Page, the EDFS shall provide users with the ability to change following information:

1.4.64.3.1.1. Title

1.4.64.3.1.2. Display Starting Date; the default date shall be set to activation date

1.4.64.3.1.3. Display Starting Time; the default time shall be set to activation time

1.4.64.3.1.4. Remove From Site Date; the default date shall be set to deactivation date plus one day

1.4.64.3.1.5. Remove From Site Time; the default time shall be set to deactivation time

1.4.64.3.1.6. Message

1.4.64.3.1.7. Indication of “Breaking News or Construction” Event.

1.4.64.3.2. EDFS shall provide a list of active breaking news and construction in the system and operators shall be able to edit and clear them.

1.4.64.3.3. Users shall be able to able to search breaking new and construction by title text.

1.4.64.3.4. EDFS shall allow user to deactivate traffic message without closing parent event in EDFS

1.4.64.4. 511 Floodgate Manager

1.4.64.4.1. EDFS shall provide user pre-generated editable message to be played by IVR

1.4.64.4.2. The EDFS shall allow users to specify the phone menu locations for playing the floodgate.

1.4.64.4.3. The EDFS shall allow a floodgate to be played at multiple locations in the phone menu.

1.4.64.4.4. EDFS shall allow users to see floodgate messages associated with individual menu hierarchy locations, their playing priorities/order and be able to change priorities of the floodgates to be played.

1.4.64.4.5. EDFS shall allow user to deactivate floodgate message without closing parent event in EDFS

1.4.65. The EDFS may allow users to select each of the integrated tools/systems for activation:

1.4.65.1. Regional Emergency Abbreviation System (EAS)

1.4.65.1.1. When the user activates the regional EAS (phone), the EDFS shall provide users with the ability to upload multiple floodgates, including a Main Menu Floodgate message and Floodgate messages at appropriate menu locations.

1.4.65.2. Sub-Regional Emergency Abbreviation System (EAS)

1.4.65.2.1. When the user activates the sub-regional EAS (phone), the EDFS shall provide users with the ability to upload multiple floodgates, including a Main Menu Floodgate message and Floodgate messages at appropriate menu locations.

1.4.65.3. Emergency Web Site

1.4.65.3.1. When the user activates the Emergency Web Page, the EDFS shall provide users with the ability to change following information:

1.4.65.3.1.1. Short Description for the page title (Page Banner)

1.4.65.3.1.2. Detailed description for the blog entries (Post and Update functionality)

1.4.66. The EDFS shall provide dedicated user interfaces for event message editing along with publishing options specific for each tool/external integrated system.

1.4.67. External integrated system user interfaces should be pre-populated with the information available (activation/deactivation dates, titles, detail descriptions, impact, etc.) Each individual user interface should allow users to customize which fields' information will be used.

1.4.68. The EDFS shall only allow authorized users to edit the final message for publishing to the selected external integrated tools.

Alarm Settings

1.4.69. The EDFS shall allow users to set an alarm time by specifying the date and time.

1.4.70. The EDFS shall allow users to turn on an alarm.

1.4.71. The EDFS shall allow users to turn off an alarm.

1.4.72. The EDFS alarm default settings should depend on the event type and severity/impact (for example planned construction alarm time shall use 4 hours lead).

1.4.73. The EDFS shall set the default alarm start time as event type specific time interval prior to the activation time. For e.g. in case of sporting event, operators may choose to set an alarm that will appear 2 hours prior to activation.

1.4.74. The EDFS shall set the default alarm end time as event type specific time interval prior to the deactivation time. For e.g. in case of scheduled construction event, operators may choose to set an alarm that will appear 30 minutes prior to deactivation.

1.4.75. For all published events (incidents/closures etc.) which do not have a scheduled end date and time, EDFS shall periodically show an alarm to the owner or everyone, say every 30 minutes after the event was published. The alarm shall automatically reappear after 30 minutes of confirming/closing of an alarm and if the event is still active.

1.4.76. The EDFS shall allow users to modify default alarm time by specifying the date and time of the alarm as the number of minutes before and after the Activation Date/Time, Event Scheduled Start Date/Time or Event Scheduled End Date/Time.

1.4.77. The EDFS shall allow users to add notification text to be used by the alarm.

1.4.78. The EDFS shall allow users to mark alarm as “global” – force alarm to be shown to all logged in users in parallel regardless of event ownership.

1.5. User Preferences

1.5.1. The EDFS may allow the user to change their first/last names, user-specified phone number to be shown by the system (if user permissions allow this customization).

1.5.2. The EDFS may allow the user to change their email address (if user permissions allow this customization).

1.5.3. The EDFS shall allow the user to change their EDFS account password.

1.5.4. The EDFS shall allow the user to save their user preferences settings.

1.5.5. The EDFS shall allow users to save their event filters such that the selections do not get lost between interactions. The filters shall be remembered across browsers sessions and computers.

1.5.6. The EDFS shall allow the user to select security questions (at least two) and specify their answers for password reset functionality.

1.5.7. The EDFS may allow the user to set preferences for showing or hiding the list of nearby, actively published events for each event type.

1.5.8. The EDFS may allow the user to set preferences for the refresh frequency on the event list.

1.5.9. The EDFS may allow the user to set preferences for showing or hiding the confirmation dialogue window before the user save the modifications to the Event Details.

1.6. Alarm

1.6.1. The EDFS shall send alarms to the operators as a form of notification that some action is required for an event that exist in the EDFS.

1.6.2. The EDFS alarms shall be shown to the event owner first and then (after period of inactivity configurable in system settings) to all operators logged into the system.

1.6.3. The EDFS alarms marked as “global” shall be visible to all operators logged on to the EDFS system.

1.6.4. The EDFS alarms shall remain visible on the user's display until at least one user confirms acknowledgement of the alarm (for example by clicking on a button on the popup) or "snooze" it for a time period configurable in the alarm user interface.

1.6.5. Multiple alarms shall be grouped together on a single alarm user interface as a list with each alarm being accessible (for deactivation, "snoozing", etc.) individually.

1.6.6. The audible alarm shall sound for 5 seconds and then shall shut off for a programmable period of time from 5 seconds to 2 minutes.

1.6.7. The EDFS shall periodically send an alarm at all logged-on workstations if there is any active event without an owner within 3 minutes of receipt of event.

1.6.8. The EDFS shall send an alarm to the event owner if a manually created event is in the system for 30 minutes without being published.

1.6.9. Upon confirmation of the active alarm, the EDFS shall allow a user to open event details view of the event(s) that appeared in the active alarm.

1.6.10. The EDFS alarms user interface shall display the following fields:

1.6.10.1. Event Type

1.6.10.2. Event Last Modified Date and Time

1.6.10.3. Publishing Status

1.6.10.4. Published Message (if applicable)

1.6.10.5. Owner

1.7. Reporting

1.7.1. Users shall be able to select the reports to be generated.

1.7.2. Unauthorized users shall not be able to generate reports.

1.7.3. The EDFS Report Page shall allow users to generate reports for data entries up to a configurable number of days in the past.

1.7.4. The EDFS Report Page shall provide the ability for the user to select the time period range (time of day and date) and the type of the events to be included in the reports. The EDFS Report Page shall be able to generate reports using archived event data up to one prior year period.

1.7.5. The EDFS Report Page shall be able to generate a report of events that were active within a date range and or on a specific roadway segment based on date and roadway parameters provided by the user.

1.7.6. The EDFS Report Page shall be able to generate event audit report based on event ID provided by the user.

1.7.7. The EDFS shall calculate and be able to display and export TIC and system performance measures reports:

1.7.7.1. Event Activities Reports (per time period)

1.7.7.1.1. Average Event Duration from new to close.

1.7.7.1.2. Number of Events Collected

1.7.7.1.3. Number of Events Modified

1.7.7.1.4. Number of Events Discarded

1.7.7.1.5. Number of Events Disseminated

1.7.7.1.6. Number of Events Closed

1.7.8. The EDFS should calculate and be able to display and export TIC performance measures reports:

1.7.8.1. User Performance Measures Reports (per user per time period)

1.7.8.1.1. Number of Events that were published

1.7.8.1.2. Average Event Handling Time i.e. average time taken by operator to update an event.

1.7.8.1.3. Total number of Events Modified

1.7.8.2. Current Performance and Activities Reports ()

1.7.8.2.1. Number of logged in users currently logged in.

1.7.8.2.2. Number of Published Events currently in published state.

1.7.9. When reports include data from current date/time, the EDFS shall refresh the report within 15 seconds from change(s) being made to the data requested by the user.

1.7.10. Reports shall be generated by accessing data in the database directly.

1.7.11. Report generation shall not degrade overall system performance.

1.7.12. The EDFS shall be able to generate a report and display it on the operator's screen within 30 seconds from the request for report submittal.

1.7.13. Users shall be able to generate reports in Excel, Word and PDF formats.

1.8. System Management

General requirements

1.8.1. All system management functions shall be available only to the users with system administrator privileges.

User Privileges and Security Settings

1.8.2. Authorized users shall be able to add, delete, and edit other users' accounts, reset other users' passwords, activate/deactivate users.

1.8.3. The EDFS shall allow users to be assigned to operator, supervisor and system administrator groups and applied group-specific privileges and functionality access levels accordingly.

1.8.4. The EDFS shall allow to assign/revoke privileges to individual users

1.8.5. User level privileges shall control access to the data at least by:

1.8.5.1. data source,

1.8.5.2. event type,

1.8.5.3. action performed on event (view, create/modify/confirm and publish, discard, close)

1.8.5.4. external integrated systems selected for dissemination

Data Sources Settings

1.8.6. Authorized users shall be able to add/modify/delete data sources that are available.

1.8.7. The EDFS shall allow switching existing data sources on and off.

1.8.8. The EDFS shall allow switching existing data sources between manual and automated publishing modes.

1.8.9. The EDFS shall allow editing the tables with lookup lists that are used as a data source by user interface predefined selection controls (drop-downs, lists, etc.).

Communication Settings

1.8.10. Authorized users shall be able to add/modify/delete event publishing destination(s) (JMS).

1.8.11. Authorized users shall be able to add/modify/delete all database connections used by the system.

1.8.12. Authorized users shall be able to modify settings required to establish communications to each external integrated system (API URLs, server names, etc.)

System Configuration Settings

1.8.13. All system management functions shall be available via web-based user interface for all modules in the EDFS except for the minimal configuration such as database connection that is required to bootstrap the system.

1.8.14. The EDFS web based system configuration shall be sufficient for all configuration management tasks after initial installation.

1.8.15. The EDFS shall provide interface for event workflow management.

1.8.16. The EDFS shall provide ability to configure automatic deletion of old ad-hoc and text-to-speech floodgate messages.

1.8.17. The EDFS shall provide interface for archived data export and purge functionality

System Status

1.8.18. The EDFS shall provide interface for system status reporting.

1.8.19. System status reporting interface shall provide list of the errors and warnings for time period specified by the user.

1.8.20. System status reporting interface shall provide access to errors and warnings from all modules.

2. System Requirements

2.1. General

2.1.1. The EDFS software shall allow at least ten (10) concurrent users to be logged in at the same time.

2.1.2. The EDFS software shall not require any regularly scheduled down time, it may require down time for updates that would be scheduled as needed.

2.1.3. The EDFS software shall be capable of running unattended for a minimum of twenty four hours.

2.1.4. The EDFS Software shall have an availability of at least 99.72% of the time measured annually excluding planned maintenance and service anomalies that are beyond EDFS control.

2.1.5. The EDFS shall be capable of operating unattended 24-hours per day, seven days per week, for any contiguous 365-day period, excluding periods when planned maintenance is scheduled.

2.1.6. The EDFS system shall adhere to open architecture standards.

2.1.7. The EDFS shall be designed as a modular structure that can accommodate new data collection, processing, publishing or external system integration modules without changes in core EDFS system.

2.1.8. The EDFS shall be scalable such that it is capable of supporting more operators, data sources or external integrated systems.

2.1.9. The EDFS shall be able to scale both horizontally (scale out) and vertically (scale up) without changes in the code, when applicable. Certain parts of

the system that aren't idempotent and cannot be load divided are exempted from this requirement.

2.1.10. The EDFS shall be able to handle at least 1,000 events published/active in parallel without performance degradation in comparison to the performance when 1 event is being published.

2.1.11. The EDFS shall be able to handle at least 20,000 events published during 24 hour period without performance degradation.

2.1.12. In cases when COTS (commercial off the shelf software) is used as part of EDFS it shall be documented to establish a baseline for configuration management. All changes made to the baseline version shall be tracked and included in documentation.

2.1.13. The EDFS system shall consist of free/open source software/code wherever possible.

2.1.14. The EDFS system shall be provided with a complete documentation in electronic format (PDF or HTML format) package that shall include, but not be limited to, detailed functional and interface description, user/operator manuals for each type of user, test plans and procedures.

2.1.15. The EDFS shall use a single Network Time Protocol Time Server as the system master clock to ensure uniform timestamps.

2.1.16. The EDFS shall be able to run on multiple web and application servers in parallel and share load between them.

2.1.17. When one of the servers fails the EDFS system shall continue operating normally assuming a redundant server of that type is available (i.e., automated failover).

2.1.18. In the event of a workstation failure, users shall be able to log into other workstations and have the same functionality as they would if they were at their own workstation.

2.1.19. The EDFS software shall not prevent system administrators from access to the security of the operating system and operating system functionality (access to disk drives, system configuration).

2.1.20. The EDFS shall store configuration information in the database.

2.1.21. The EDFS shall be able to apply configuration changes without restarting software or hardware and affecting users logged in. However change to database connection or anything that is required to bootstrap the system may require software restart.

2.1.22. The EDFS shall be able to expand geographical coverage area lookup lists/tables.

2.1.23. The EDFS shall provide API for maintenance and system configuration/management tasks that could be used from operating system scripting environment.

2.1.24. The EDFS should be able to accommodate functionality extensions that use live video feeds.

2.1.25. The EDFS should be able to automatically delete ad-hoc and text-to-speech floodgate recordings for a configurable number of days in the past.

2.2. Authentication/Authorization

2.2.1. The EDFS security shall use encrypted passwords to identify which users or groups can access what levels of software functionality.

2.2.2. Each user added to a group shall inherit the functionality of the group.

2.2.3. The EDFS software shall use windows domain authentication for user login.

2.2.4. The EDFS shall use LDAP standards for user authentication and authorization.

2.2.5. The EDFS shall control user access to the features depending on the user group they belong to or individually granted privileges.

2.3. Data Collection, Management and Distribution

Data Collection

2.3.1. The EDFS shall collect the following data types:

2.3.1.1. Incident data

2.3.1.2. Planned Construction data

2.3.1.3. Planned Event data

2.3.1.4. Roadwork/Road closure data

2.3.1.5. Transit schedule delays data

2.3.1.6. Weather data

2.3.2. The EDFS shall collect data from multiple data sources simultaneously.

2.3.3. The EDFS shall be able to collect and process data and publish it to JMS automatically.

2.3.4. The EDFS shall be able to collect and process data and provide it to operators for review and manual publishing.

2.3.5. The EDFS shall be able to collect, process and automatically publish data from following sources:

2.3.5.1. Caltrans LCS

2.3.5.2. Caltrans CWWP

2.3.5.3. CHP CAD

2.3.5.4. Events Venue Provider RSS/Atom feeds

2.3.5.5. Twitter

2.3.5.6. Structured email messages (e.g. well defined structure text as in Sigalert)

2.3.5.7. Transit Agencies

2.3.6. The EDFS should be able to collect, process and automatically publish data from following sources:

2.3.6.1. Caltrans D-4 ATMS

2.3.6.2. Media (e.g. Radio, TV, News feed)

2.3.6.3. Email messages (unstructured)

2.3.7. Each data source shall be switchable between automatic or manual publishing modes.

2.3.8. The EDFS shall provide way to manually create/modify/publish event.

2.3.9. The EDFS shall provide way to filter events to be added to the EDFS from external data sources based on any event data fields.

2.3.10. The EDFS shall be able to accommodate new data sources by adding new software modules without changing existing code.

2.3.11. The EDFS shall provide plugin API and documentation so new data collection modules can be added later by 3rd party developers.

2.3.12. The EDFS shall be able to receive data from external data sources as full dataset and/or change log only.

2.3.13. The EDFS should be able to accommodate data collection extension for CMS (Changeable Message Sign) system data integration.

2.3.14. The EDFS may be able to accommodate data collection extension for C2C (Center To Center) system data integration.

2.3.15. Adding a new data source shall not negatively affect EDFS performance, assuming that hardware resources (CPU, memory and disk storage) utilization is below 80%.

2.3.16. EDFS should automatically retrieve transit configuration information (lists of agencies, routes, directions, stops used in transit related event UI lookup lists) from services/APIs provided by other 511 subsystems at predefined (in configuration) frequency. Newly retrieved transit configuration data shall replace existing one. EDFS shall be able to show configuration information as it was at the moment of event update in its' archived data (e.g. show route/stop/direction/etc. names as they were used in the system when event was active, not at the moment of archived data review or report generation).

Data Maintenance

2.3.17. The EDFS shall automatically propose changes to be made when data related to the event in the EDFS in the external data source changes (including event closure).

2.3.18. The EDFS shall be able to match and update already existing events when new data is received.

2.3.19. The EDFS shall automatically deactivate/remove pending alarms for events when they get closed.

2.3.20. The EDFS shall be capable to identify duplicates of the existing events coming from different sources based on event location and title/subject, mark event accordingly and warn operators.

2.3.21. The EDFS shall be capable to identify duplicates of the existing events coming from the same source based on event location and title/subject, mark event accordingly and warn operators.

2.3.22. The EDFS should provide analytical function that identifies unusual conditions and alerts users – e.g. unusual slowdown compared to historical speed profile without incident in proximity.

2.3.23. The EDFS should provide analytical function that identifies nearby events within proximity of new events.

Data Distribution

2.3.24. New data shall be published or closed by EDFS to JMS within one minute of being submitted by an operator or an automated data publishing module.

2.3.25. The EDFS shall use the XML format currently in use when publishing data to JMS.

2.3.26. In case of an initial failure the EDFS shall immediately retry publication of the events to JMS until it succeeds.

2.3.27. In case of an initial failure the EDFS shall immediately retry sending commands and data to external integrated systems' APIs until it succeeds.

2.3.28. The EDFS shall be able to send commands/data to the following external integrated systems:

2.3.28.1. Congestion OI

2.3.29. The EDFS should be able to send commands/data to the following external integrated systems:

2.3.29.1. Ticker Administration Tool

2.3.29.2. 511 Transit CMS

2.3.29.3. 511 Traffic Admin

2.3.29.4. 511 Floodgate Manager

2.3.29.5. Twitter

2.3.30. The EDFS may be able to send commands/data to the following external integrated systems:

2.3.30.1. Regional Emergency Abbreviation System (EAS)

2.3.30.2. Sub-Regional Emergency Abbreviation System (EAS)

2.3.30.3. Emergency Web Page

2.3.31. The EDFS shall be able to accommodate new external integrated systems by adding new software modules without changing existing code.

2.3.32. The EDFS shall be able to accommodate new publishing system in addition to existing JMS by adding new software modules without changing existing code.

2.3.33. The EDFS shall provide plugin API and documentation so new data dissemination modules (including UI) can be added later by 3rd party developers.

2.3.34. The EDFS shall compare published/active event data with web and phone dissemination systems at predefined (configurable) frequency and send error reports when data is out of synch (i.e., “watchdog”).

2.3.35. The EDFS shall compare published/active event data with external integrated systems at predefined (configurable) frequency and send error reports when data is out of synch.

2.3.36. Adding new distribution channel shall not negatively affect EDFS performance, assuming that hardware resources (CPU, memory and disk storage) utilization is below 80%.

2.4. Data Archiving

2.4.1. The EDFS shall archive event data (move data to separate storage/database/tables after preconfigured time interval; 15 days by default).

2.4.2. Archived event data shall contain full event information available in the system including audit data.

2.4.3. Archived event data shall be time-stamped.

2.4.4. The EDFS shall support the export of archived data to comma delimited format files.

2.4.5. The EDFS shall support archived data export and purging (manually) based on parameters specified by user.

2.5. Database and Data Storage

2.5.1. The EDFS shall use database (RDBMS) for data storage needs.

2.5.2. The EDFS shall not need multiple databases.

2.5.3. Database used by EDFS shall be Open Data Base Connectivity (ODBC) and Java Database Connectivity (JDBC) compliant and support Structured Query Language (SQL) database queries.

2.5.4. The EDFS shall be capable of running in a clustered database configuration.

2.5.5. The EDFS shall be capable of running in a replicated database configuration.

2.5.6. The EDFS shall use configurable parameters for connecting to the database.

2.5.7. The EDFS shall accommodate 10-fold growth of the data in the database compared to the size of the data at initial system deployment and launch.

2.5.8. The EDFS shall be flexible to allow for the addition or reconfiguration of database structures without the loss of current or past data.

2.6. Ownership Requirements

2.6.1. Ownership rules shall apply to incidents created by the operator or the system for publishing onto any user-selected combination of dissemination channels.

2.6.2. When an operator logs off from the EDFS, any incidents owned by that operator shall become non-owned and the events shall be highlighted and alerts shall be sent to all logged on the EDFS that there is a non-owned incident(s) in the system.

2.6.3. Incidents shall be owned by one of the operators logged into EDFS within 3 minutes from the time it becomes available or “non-owned”.

2.7. Audit Tracking Mechanism

2.7.1. The EDFS shall track and record all modifications made to the event including but not limited to initial record creation, event status changes, data field values’ changes, relationship changes, ownership changes, updates made to external integrated systems, alarms shown, and publishing options.

2.7.2. The EDFS shall track and record all errors related to the event as part of the audit track.

2.7.3. The EDFS shall track and record data received from external data sources that were used to create or change event data.

2.7.4. All audit track records shall contain information about user responsible for change (including system as a user for automated updates) and timestamp when change happened.

2.8. Testing

2.8.1. The EDFS system shall be provided with test plans and test procedures for integration cases and the system acceptance test to ensure that each test is comprehensive and verifies all the features of the function to be tested.

2.8.2. Each test procedure shall list the objective of the testing and the specific EDFS software system requirement(s) that are being verified along with pass/fail criteria for each.

2.8.3. Test procedures shall include the following items:

2.8.3.1. Function(s) to be tested and corresponding requirement(s);

2.8.3.2. Set-up and conditions for testing including ambient conditions;

2.8.3.3. Step-by-step procedures to be followed;

2.8.3.4. Pass/Fail criteria for each requirement tested including measurement tolerances;

2.8.3.5. All inputs and expected results outputs for each test segment;

2.8.3.6. Descriptions of all simulation tools and techniques used during the test.

2.9. Error messaging

2.9.1. The EDFS shall provide error reporting and logging functionality.

2.9.2. Error conditions shall be reported and logged as they are detected.

2.9.3. The amount of data logged (“log level”) for an error condition shall be able to be adjusted in real time by authorized users through the GUI without having to restart the application.

2.9.4. Each error message (logged or reported) shall be time stamped and shall provide enough information to identify nature of the issue and trace back to the origin of the error (”stack trace”).

2.9.5. System management user interface shall provide tool for error log reviewing

2.9.6. Error logs shall use text format and be stored in the database, file system or operating system event logs.

2.9.7. Error logs shall not be deleted or cleaned automatically

2.9.8. Error reporting functions shall include the ability to send notifications via email as well as visual and audio notifications at the user interface.

2.9.9. Notifications shall be sent to a configurable list of people through a primary and secondary email server.

2.9.10. Error reporting functions shall include the ability to use SNMP (Simple Network Management Protocol).

~~2.9.11. The EDFS shall send notifications to a configurable list of users when the number of EDFS operations performed by any user in a set time interval reaches a configured threshold level, e.g. 50 operations in an hour.~~

2.9.12. The EDFS shall send notifications to a configurable list of users when the number of not-owned events in a set time interval reaches a configured threshold level, e.g. 10 not-owned events in an hour.

Attachment 1 – Glossary

Terms	Abbreviations	Definition
511 Floodgate Manager		See "511 Manager"
511 Manager		A web-based utility application that enables users to view and/or manage various types of pre-recorded messages that can play back at different points within the 511 phone system, such as a floodgate message at a selected menu location.
511 Traffic Admin		See "Traffic Admin Page"
511 Transit CMS		See "Transit Content Management System"
Application Programming Interface	API	A particular set of rules and specifications that describe an interface for the interaction with a set of functions used by components of a software system.
Atom Feeds		XML language format used for web data feeds
Break-a-Link	B-A-L	A feature in the Congestion OI application that, by using a table of pre-defined 'critical' links, generates pre-determined alternate trips that are greater in length than the normally allowed distance of 150% of the default trip distance. BAL allows closures of critical locations (currently, only the bridges have critical links assigned) to generate alternate trips greater than 150%.
California Highway Patrol Computer Aided Dispatch	CHP CAD	A web-based utility application that contains detailed information about all incidents to which the California Highway Patrol responds.
CalTrans LCS		See "Lane Closure System"
Congestion OI		A software application that allows the 511 Traveler Information Center operators to overwrite speed data on an individual link basis and to close links. When a link is closed, a roadway closed message should play and driving times should not be given for the route which includes the broken link and an alternate route will be given if its distance is less than 150% of the default route.
Commercial Wholesale Web Portal	CWWP	A single portal developed by Caltrans that provides travel information for California regions in various data formats.
Commercial Off The Shelf	COTS	Item that is sold in substantial quantities in commercial marketplace and available to general public
Enhanced Data Fusion System	EDFS	A combination of computer hardware and software systems at the TIC that communicates with other subsystems, including several interrelated applications that provide the TIC staff with the ability to enter, view, and analyze relevant traffic data, and an Internet-enabled system to receive event input from other agencies and display existing events. The data fusion system extends to and includes the interfaces with the data collection and data dissemination servers.
Emergency Abbreviated System for the Phone	EAS for the Phone	Two phone menu structures that are available for use during emergency situations. The regional phone EAS allows the restriction of information disseminated during an emergency in order to provide critical information to as many callers as possible. The sub-regional phone EAS allows the organization of information for a sub-regional planned event or emergency in a separate menu from the regular main

		menu, thus making it easier for callers to access the emergency information.
Emergency Abbreviated System for the website	EAS for the website	An additional webpage that summarizes emergency information in a blog format. At a minimum, the regular homepage and traffic pages are redirected to this EAS webpage during major, regional emergencies.
Emergency Operational Procedures	EOP	Document that defines TIC staff actions in case of emergency
Event		A real world happening recorded in the EDFS to be disseminated to the public users. An Event is anything that affects transportation - traffic or transit. Examples are concert, sporting event, parade, marathon, roadway construction, weather, emergencies and incidents. Incidents are unplanned events such as traffic accident, bridge/roadway closure, transit disruption and transit delay,..
Event OI		The interface through which TIC staff enter incident or event information into the EDFS. While this interface is titled the "Event OI," TIC staff enters more than just events.
Floodgate		Message played by IVR at some menu branch before accepting user input
Incident		Type of an event that describes traffic/transit incident in the system
Interactive Voice Response	IVR	Technology that allows a computer to interact with humans through the use of voice and DTMF telephone keypad inputs
Java Database Connectivity	JDBC	An API for the Java programming language that defines how a client may access a database
Java Messaging System	JMS	A Java Message Oriented Middleware (MOM) API for sending messages between two or more clients.
Lane Closure System	LCS	A web-based utility application that contains lane closure information gathered on both a daily and long-term basis by Caltrans for the entire District 4 area.
Lightweight Directory Access Protocol	LDAP	Protocol used for accessing and maintaining distributed directory information services
Open Database Connectivity	ODBC	Standard software interface for accessing database management systems
RSS feed		A family of web feed formats used to publish frequently updated works in a standardized format.
Relational database management system	RDBMS	Database management system that is based on the relational model
Simple Network Manager Protocol	SNMP	Internet-standard protocol for managing devices on IP networks
Standard Operational Procedures	SOP	Document that defines TIC staff actions on daily basis
Ticker		A scrolling banner on 511.org and several modal pages that displays breaking news, including major traffic disruptions and transit delays/disruptions
Ticker Admin Page		Ticker.511.org A web-based utility application that enables users to view and/or manage the Ticker messages for all 511 sister pages.
Ticker Administrative Tool		See "Ticker Admin Page"
Traveler's Information Center	TIC	The 511 operations center, collocated with Caltrans and the CHP, which collects and disseminates incident and event data through 511.

Traffic Admin Page		Traffic.511.org/admin511traffic A web-based utility application that enables users to view and/or manage the traffic messages, breaking news and construction, on traffic.511.org
Traffic Management Center	TMC	Caltrans central control room in each district where operators manage traffic incidents, operate the TOS equipment in the field, manage the maintenance of the roadways and oversight of traffic control for construction projects.
Transit Content Management System	CMS	A web-based utility application through which TIC, MTC and transit agency staff manage Transit agency service announcements onto the Transit.511.org website.
Extensible Markup Language	XML	Set of rules for encoding documents in machine-readable form